

Inspection of battery cells by X-ray computed tomography

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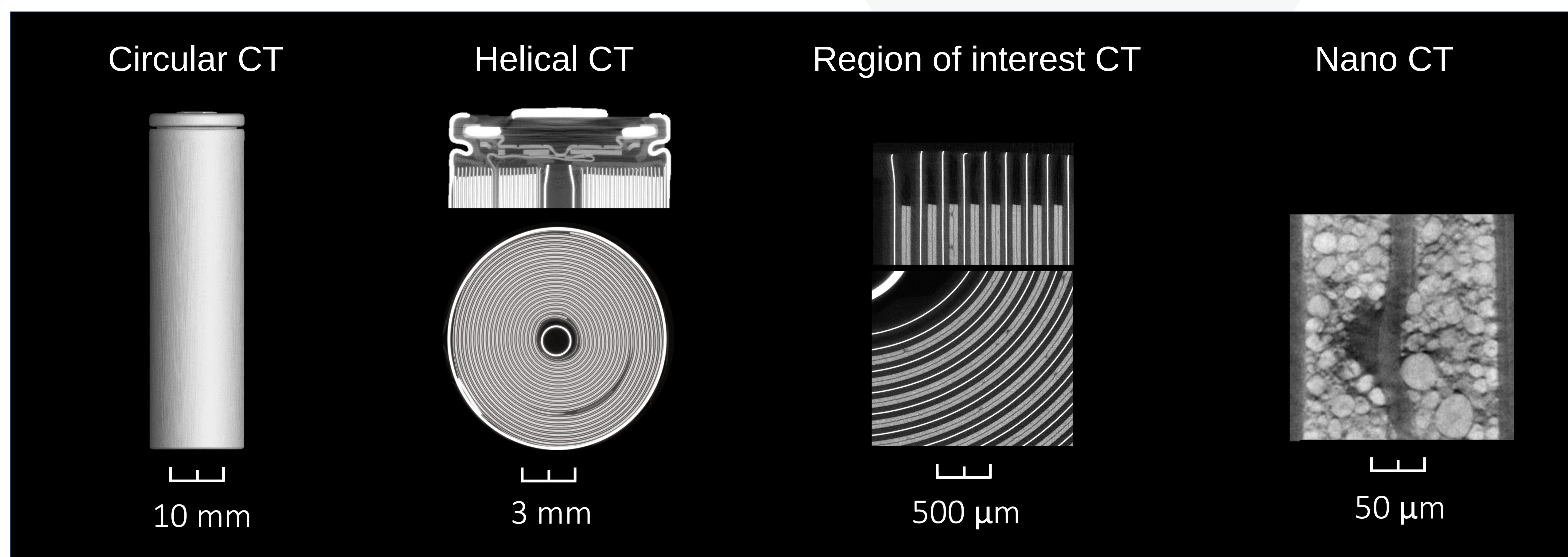


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Li-ion batteries are ubiquitous energy storage devices. Their performance closely depends on internal structure, where minor changes or defects significantly affect reliability. X-ray computed tomography (CT) provides a powerful, non-destructive approach to examine battery interiors.

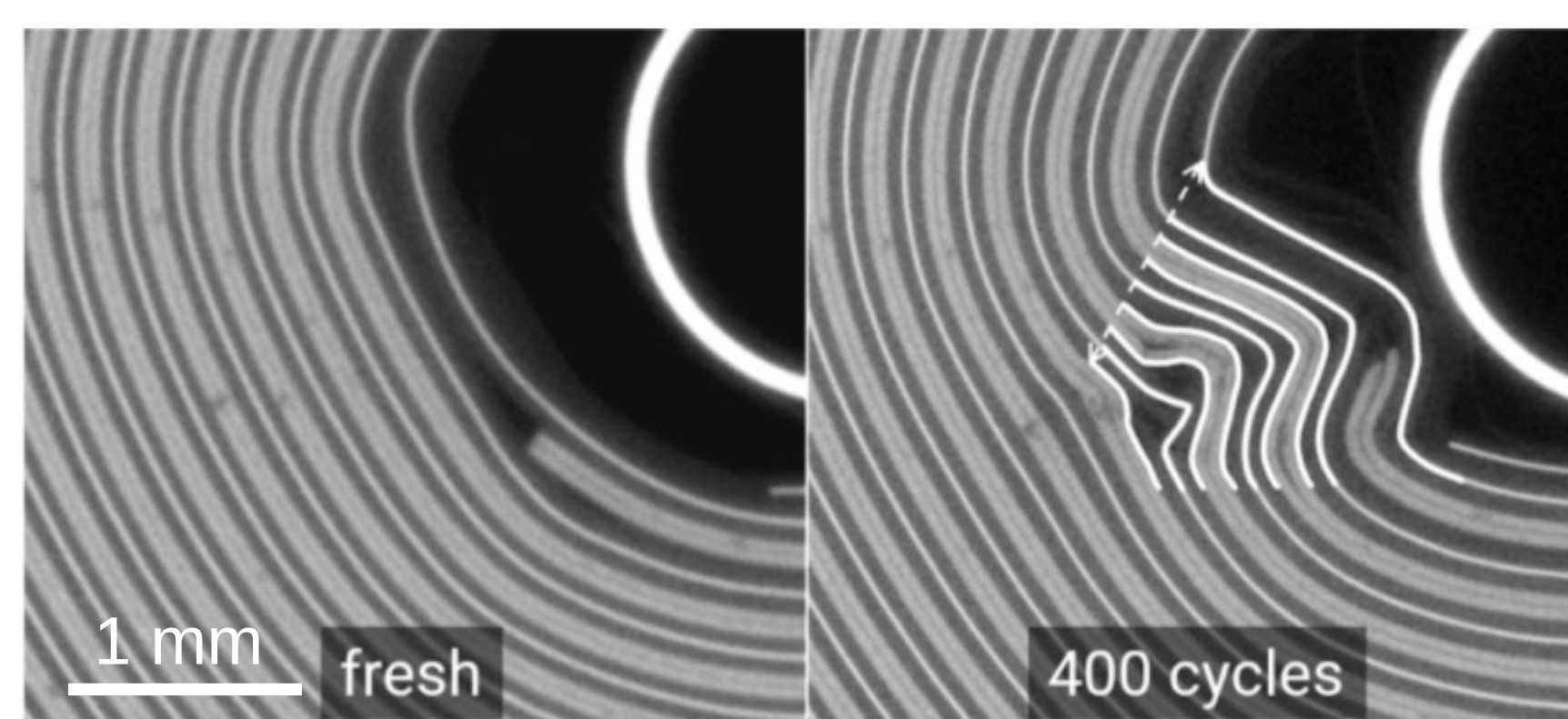
Multi-scale imaging with CT effectively reveals structural changes from cycling, aging-induced deformations, electrode thickness variations, and supports correlative analysis using nano CT together with SEM/XPS [1, 2]. Techniques like virtual unrolling further enhance clarity, facilitating straightforward battery inspection and analysis [3].

Multiscale imaging

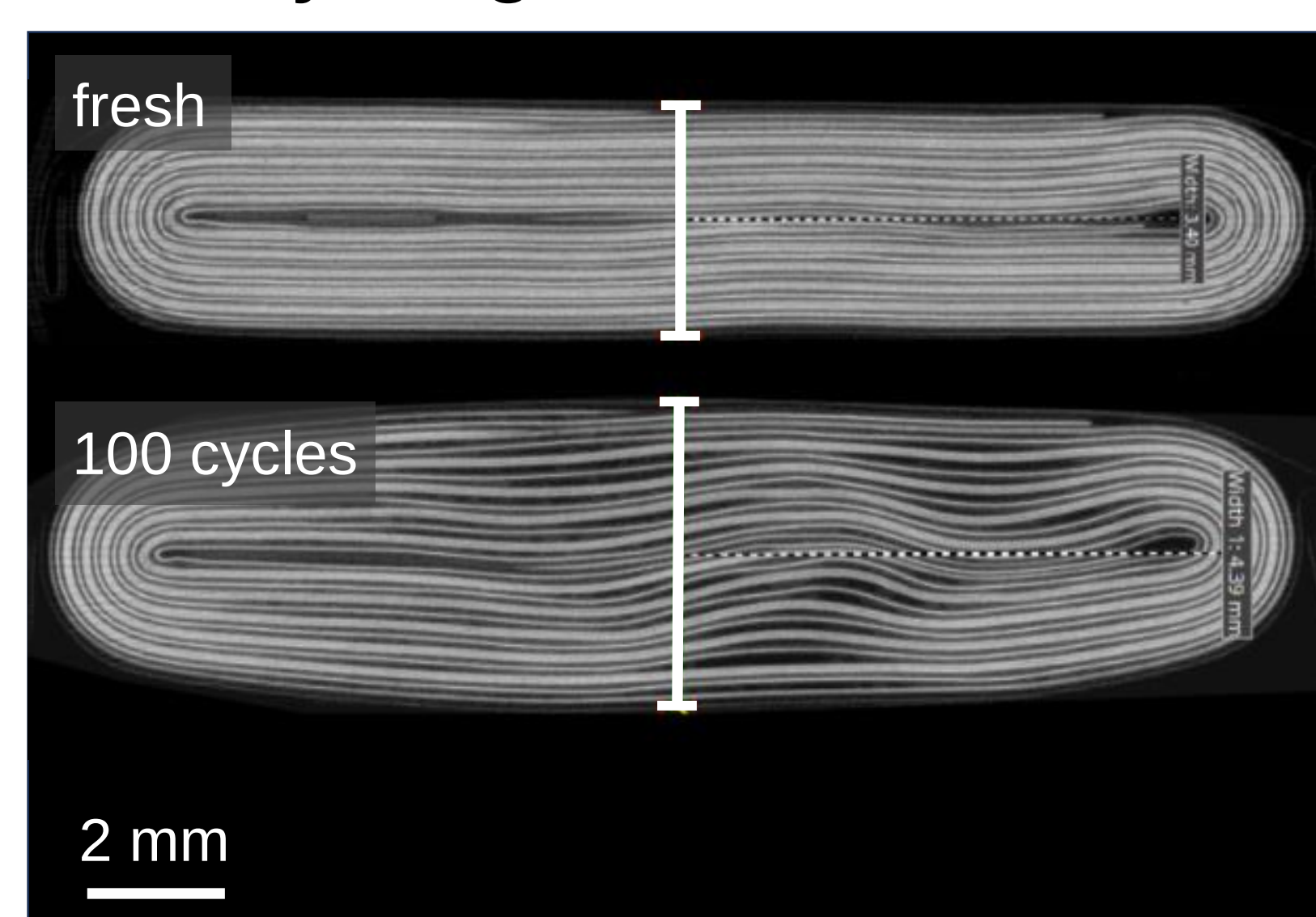


Analysis of defects and deformations

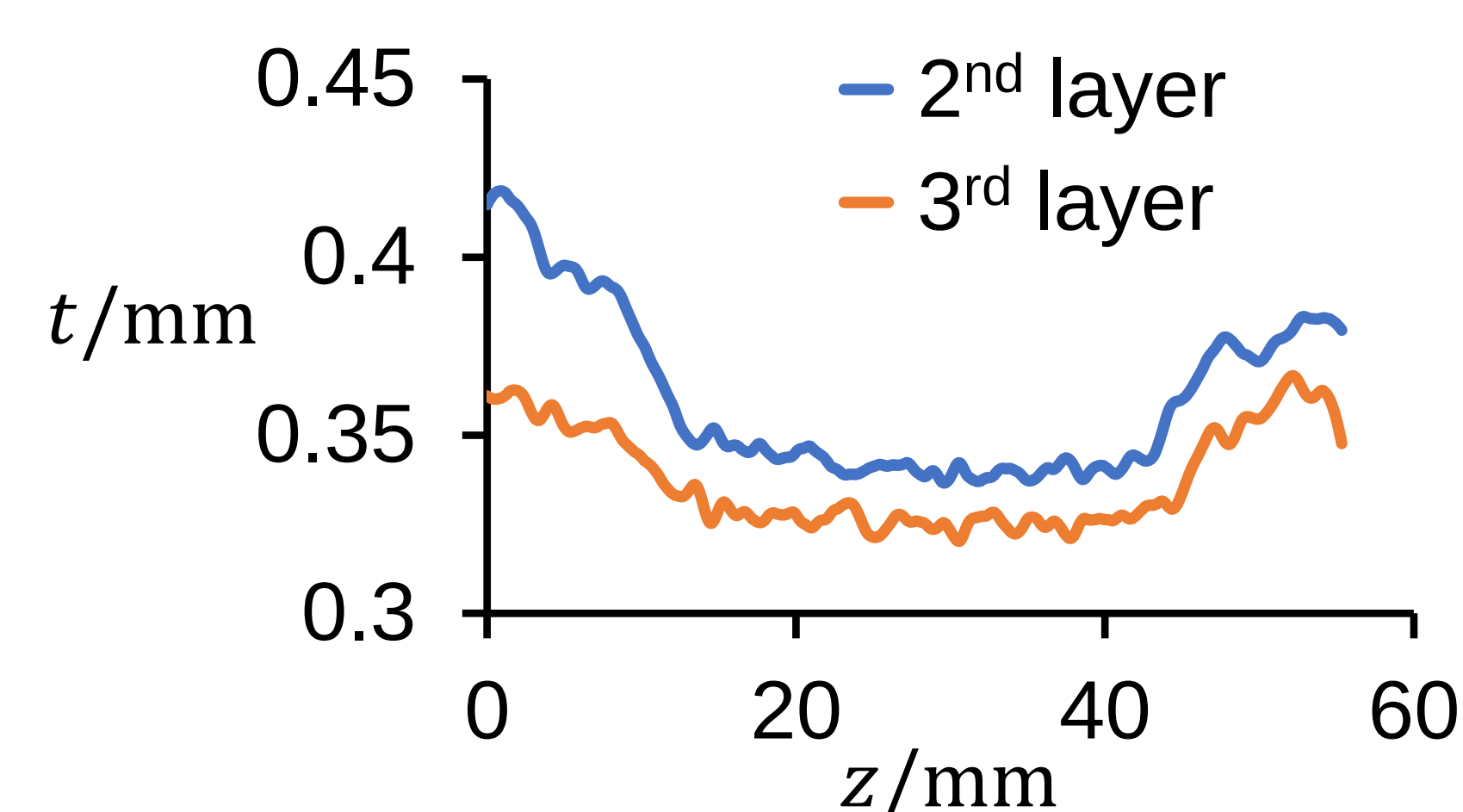
Structural changes of cylindrical cell due to aging [1]



Expansion of prismatic cell after cycling [2]

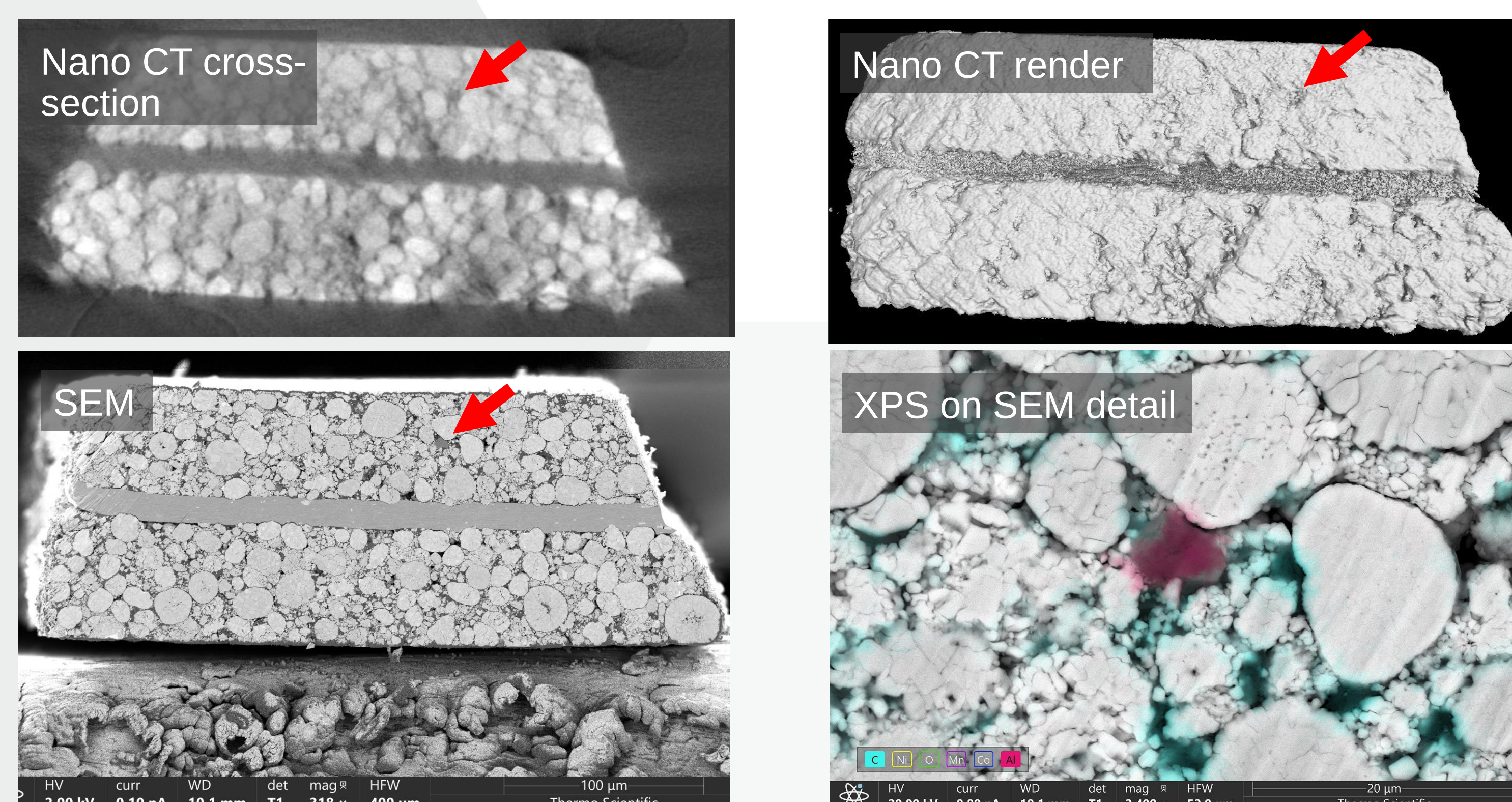


Variations in thickness t of inner layers of electrodes in used cylindrical cell along its axis z [3]



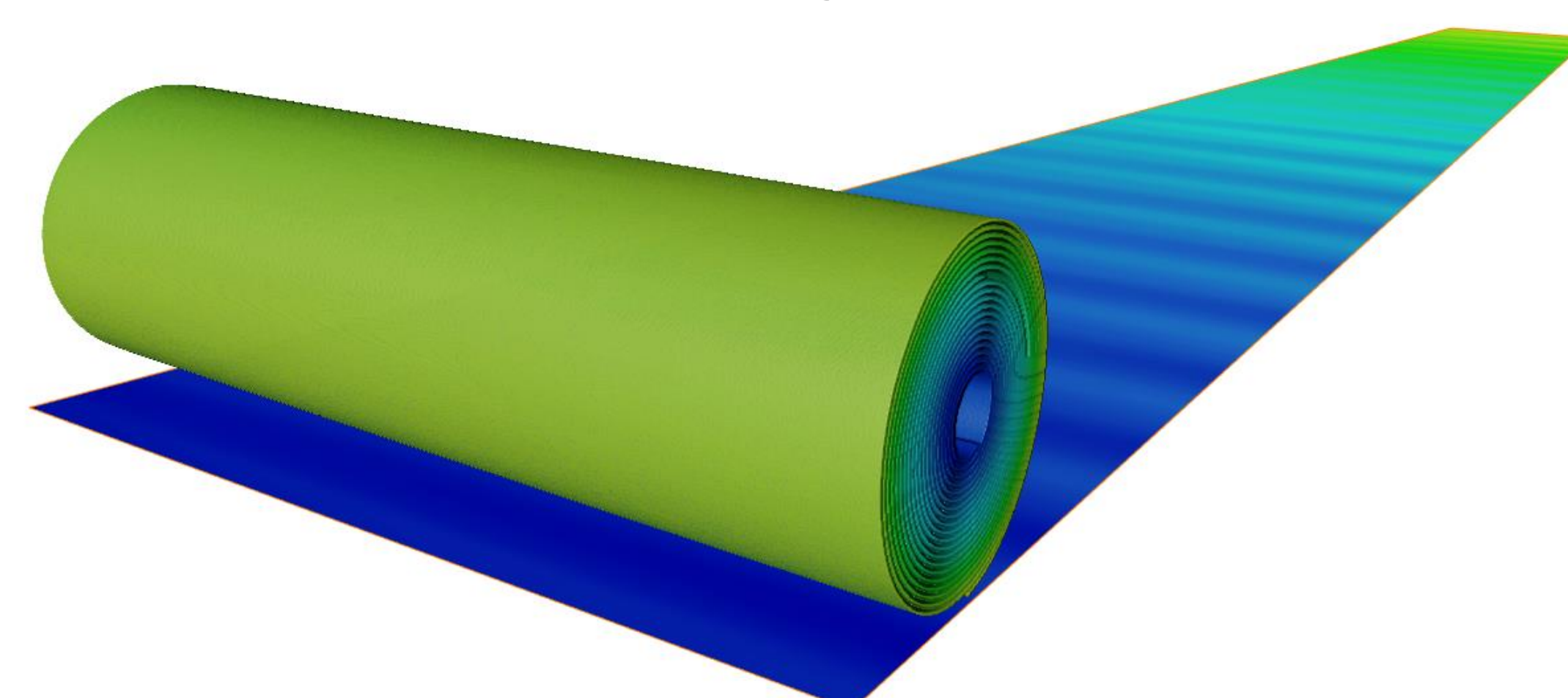
Advanced techniques

Correlative analysis by nano CT and SEM/XPS



A red arrow points to the position of the detail

Virtual unrolling for straightforward visualization and analysis [3]



References

- [1] P. Blažek, et al., ECS Trans. 105 (2021) 69–76. <https://doi.org/10.1149/10501.0069ecst>.
- [2] Z. Stravova, et al., Sci Rep 14 (2024) 28546. <https://doi.org/10.1038/s41598-024-77673-3>.
- [3] P. Blažek, et al. Journal of Energy Storage 52 (2022) 104563. <https://doi.org/10.1016/j.est.2022.104563>.

Acknowledgments

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